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11

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14

Title of the Invention

16

Combining Television Broadcast and Personalized/Interactive Information

18

Cross-Reference to Related Applications

20

This application claims priority of the following applications:

22

1 o Application No. 08/770,238, filed December 20, 1996, in the name of inventors
2 Wei Yen and Steven Weinstein, titled "Internet Multiplexer for Broadcast and
3 Other Information", attorney docket NAV-001;

4
5 o Provisional Application Serial No. 60/047,809, filed May 16, 1997, in the name of
6 inventors Steven Weinstein, James Palmer, James Fulker and Jeffrey Mock, titled
7 "User Interface," attorney docket number NAV-004P.

8
9 Each of these applications is hereby incorporated by reference as if fully set
10 forth herein. These applications are collectively referred to herein as the "Navio Disclo-
11 sures."

12 13 Background of the Invention

14 15 1. *Field of the Invention*

16
17 The invention relates to a system for combining interactive broadcast and
18 web information browser.

19
20 As used herein, the term "broadcast" includes wide variations on the theme
21 of broadcast, including cablecast, narrowcast, network multicast, "push" technology, and
22 other variations of simultaneous information distribution to a plurality of recipients.

1
2 As used herein, the term "interactive" includes wide variations on the
3 theme of interactivity and personalization, including both of the following:-

- 4
5 o interactive systems in which a recipient of information has a transmission channel
6 by which to express preferences or to request information of a specific type; and
7
8 o personalized systems in which a recipient of information can select among a plu-
9 rality of simultaneously distributed sets of information, in which the particular in-
10 formation presented to the recipient is responsive to individual or personal prefer-
11 ences or selections (instead of the information being identically presented to a
12 mass audience).

13
14 As used herein, the term "personalized" also includes wide variations on
15 the theme of interactivity and personalization, similar to those encompassed within the
16 term "interactive." Information distribution referred to herein as "interactive" also in-
17 cludes the many concepts of personalization; information distribution referred to herein
18 as "personalized" also includes the many concepts of interactivity.

19
20 As used herein, the terms "web," "HTML," and "embedded information"
21 also include wide variations on the theme of information provided by a server and in-
22 cluding links or hyperlinks to other information. For example, other internet information

1 retrieval protocols, such as electronic mail, file transfer, gopher, IRC, telnet, are within
2 the scope and spirit of the invention, and should be considered at each use of the term
3 "web." Moreover, other information formats, including SGML, XML, and graphical
4 document formats or word processor formats that allow for linking or hyperlinking, are
5 also within the scope and spirit of the invention, and should be considered at each use of
6 the terms "HTML" or "embedded."

8 2. *Related Art*

9
10 Known information distribution systems include broadcast media, such as
11 radio and television, and interactive media, such as telephone systems and electronic
12 mail. Recent computer systems include the World Wide Web (the "web"), which is in-
13 teractive in that users, using web clients, can request information from web servers, and
14 after receiving that information can display or present it for review. Information avail-
15 able using the web includes text, graphics, pictures, sound, animation, and programs or
16 program applets such as Java or JavaScript.

17
18 Many users would like to receive both broadcast information and interac-
19 tive (or personalized) information in a unified interface, whether or not that unified inter-
20 face has a return transmission channel by which to express preferences or to request in-
21 formation. It would be advantageous for the unified interface to combine both the broad-
22 cast and interactive (or personalization) features, that is, to allow the user to interact with

1 and personalize broadcast information, and to receive interactive or personalized infor-
2 mation without closely and actively requesting it. It would also be advantageous for the
3 unified interface to simultaneously present both broadcast information, and interactive or
4 personalized information, without either interfering with the other.

5
6 One problem in the known art is that broadcast television signals are de-
7 signed for presentation over the entire screen of a television monitor, while web pages
8 (and other interactive or personalized content) are also designed for presentation over the
9 entire screen, or at least most of the entire screen. Since there is only a finite amount of
10 screen space for presentation of visual material, this problem makes it difficult for the
11 user to simultaneously receive and present both broadcast information and interactive or
12 personalized information, as each tends to interfere with the other.

13
14 A first method in the known art is to reserve a separate mode on an other-
15 wise ordinary television set for presentation of web information. In this known method,
16 the user selects the separate mode for presentation of web information, and selects televi-
17 sion channels (and deselects the separate mode) for presentation of broadcast television
18 information. While this known method achieves the presentation of both broadcast and
19 interactive information, it has the drawback that both kinds of information are not pre-
20 sented simultaneously, and the user does not achieve the advantage of simultaneously
21 using both the broadcast and interactive models of receiving information.

1 A second method in the known art is to use a "picture-in-picture" feature of
2 broadcast television receivers to present a relatively smaller version of a broadcast televi-
3 sion picture while simultaneously presenting web information (or other broadcast televi-
4 sion information) to the user. While this known method achieves the presentation of both
5 broadcast and interactive information, it has the drawback that at least some of the inter-
6 active information is covered up by the picture-in-picture feature, and thus is not readily
7 viewable by the user.

8
9 A third method in the known art is to present raw text, selected from an out-
10 of-band part of the television signal such as the VBI (vertical blanking interval) in a re-
11 served section of the television display. This known method is used for "closed caption"
12 television subtitles. However, this known method only achieves the presentation of
13 broadcast information, as the subtitles are not subject to interactive use by the user.
14 Moreover, this known method is limited to presentation of only simple information, such
15 as raw text and some rudimentary block graphics; it is also opaque and interferes with
16 display of the broadcast television signal. This simple information is supplied by the
17 broadcaster for all recipient devices, and is neither interactive nor personalized.

18
19 Accordingly, it would be desirable to provide an improved method and
20 system for combining television broadcast and personalized/interactive information. This
21 advantage is achieved in embodiments of the invention in which personalized or interac-
22 tive graphical information is presented in conjunction with a broadcast television image,

1 either at an edge of the image screen or overlaid with the image screen in an opaque,
2 transparent, translucent, or at least partially transparent or translucent, image. The pre-
3 sented web information is fully interactive or personalized, and can be interacted with,
4 and personalized, by the user using all known features of interactive or personalized web
5 presentation.

6 7 Summary of the Invention

8
9 The invention provides an improved method and system for combining
10 television broadcast and personalized/interactive information. In embodiments of the in-
11 vention, personalized or interactive graphical information (such as web information) is
12 presented in conjunction with a broadcast television image, either at an edge of the image
13 screen or overlaid with the image screen in an opaque, transparent, translucent, or at least
14 partially transparent or translucent, image. The presented web information is fully inter-
15 active or personalized, and can be interacted with, and personalized, by the user using all
16 known features of interactive or personalized web presentation.

17 18 Brief Description of the Drawings

19
20 Figure 1 shows a block diagram of a system for combining television
21 broadcast and personalized/interactive information.

Figure 2 (including panels 2A, 2B, 2C, and 2D) shows a set of diagrams of screens for displaying television broadcast and personalized/interactive information in combination.

Figure 3 shows a process flow diagram of a method for combining television broadcast and personalized/interactive information.

Detailed Description of the Preferred Embodiment

In the following description, a preferred embodiment of the invention is described with regard to preferred process steps and data structures. However, those skilled in the art would recognize, after perusal of this application, that embodiments of the invention may be implemented using one or more general purpose processors (or special purpose processors adapted to the particular process steps and data structures) operating under program control, or other special purpose circuits, and that implementation of the preferred process steps and data structures described herein using such equipment would not require undue experimentation or further invention.

System Elements

Figure 1 shows a block diagram of a system for combining television broadcast and personalized/interactive information.

1

2 A system 100 for combining television broadcast and personal-
3 ized/interactive information includes the following elements:

4

5 o one or more individual recipients 110 who receive information, and who can inter-
6 actively select information to receive or personalize the information they receive;

7

8 o a display element 120 disposed for displaying information to one or more individ-
9 ual recipients 110;

10

11 o an input element 130 disposed for receiving choices or other information from the
12 individual recipients 110;

13

14 o a display controller 140 disposed for selecting information to be distributed to the
15 individual recipients 110, and for controlling distribution of that information to the
16 display element 120;

17

18 o a broadcast information interface 150 disposed for receiving broadcast information
19 and decoding or demodulating that broadcast information for use by the display
20 controller 140; and

21

1 o an interactive information interface 160 disposed for receiving interactive or per-
2 sonalized information and transmitting that interactive or personalized information
3 to the display controller 140.

4
5 In a preferred embodiment, the individual recipients 110 comprise individ-
6 ual users, and can be distinguished by the system 100 by requiring one or more of them to
7 login or to otherwise identify themselves.

8
9 In alternative embodiments, the individual recipients 110 may include de-
10 vices that maintain information about individual user preferences, and which interact with
11 the system 100 to make the system 100 responsive to those preferences. For example, the
12 individual recipients 110 may include electronic devices such as cellular telephones,
13 pagers, or personal electronic notebooks, which record user preferences and interact with
14 the system 100.

15
16 The display element 120 includes a television monitor 121 and a speaker
17 122. The television monitor 121 is disposed for displaying still picture and motion pic-
18 ture information for viewing by the users. Similarly, the speaker 122 is disposed for pre-
19 senting audio information to the users, and can be packaged with the television monitor
20 121 as part of a television set, or can be packaged as a set of headphones for one or more
21 users.

1 The input element 130 can include a keyboard 131, such as an alphanu-
2 meric keyboard, and a pointing device 132, such as a mouse, trackball, or joystick.

3
4 In a preferred embodiment, the keyboard 131 comprises a special-purpose
5 keyboard adapted to the techniques described herein, including buttons disposed for di-
6 recting the display controller 140 to move a cursor displayed on the television monitor
7 121, and buttons disposed for selecting an item indicated by the cursor. For example, the
8 keyboard 131 can comprise a television remote control. The keyboard 131 and its opera-
9 tion can be such as described in the Navio Disclosures.

10
11 The display controller 140 includes a processor, program and data memory
12 for executing operating system and application programs, and storage for storing and re-
13 trieving one or more sets of user preferences.

14
15 In a preferred embodiment, the broadcast information interface 150 in-
16 cludes a television tuner, disposed for control by the display controller 140.

17
18 In alternative embodiments, the broadcast information interface 150 may
19 include, either in addition or instead, other devices for receiving broadcast information
20 (as that term is used broadly herein), such as a cable television receiver, a satellite re-
21 ceiver, a video-cassette player/recorder, or other known transducers for pre-selected in-
22 formation generally distributed en masse.

1
2 The interactive information interface 160 includes a communication link
3 161 to an information server 162. For example, in a preferred embodiment, the interac-
4 tive information interface 160 includes a modem 163 disposed for coupling using an ISP
5 (internet service provider) to at least one selected server on the internet (or more specifi-
6 cally, the web).

7
8 In alternative embodiments, there is no special requirement that the interac-
9 tive information interface 160 be included in the system 100. As described herein, the
10 broadcast information interface 150 may provide information in multiple streams, of
11 which one or more such streams may be selected by the individual recipients 110 for dis-
12 play.

13
14 *Nature of Display*

15
16 Figure 2 (including panels 2A, 2B, 2C, and 2D) shows a set of diagrams of
17 screens for displaying television broadcast and personalized/interactive information in
18 combination.

19
20 / / /

Menu Bar

A first panel 2A shows a screen 210 having a first region 211 for display of broadcast information or web information and a second region 212 for display of a menu bar.

In the first panel 2A, the second region 212 is for display of a menu bar, comprising a selected set of graphical and text objects for display at the request of the individual recipients 110.

In a preferred embodiment, the second region 212 includes a first sub-region 213 for display of a television signal, and a set of second sub-regions 214 for display of interactive controls. For example, the first sub-region 213 can display a television signal for a selected television channel, to which the broadcast information interface 150 is tuned for reception, even while the individual recipients 110 request and retrieve web information.

The first region 211 can either be obscured, or not obscured, by the appearance of the menu bar, at the selection of the individual recipients 110.

If the individual recipients 110 select that the first region 211 should be obscured, the menu bar overrides the display for its part of the screen 210. If the individual

1 recipients 110 select that the first region 211 should not be obscured, the broadcast in-
2 formation is redisplayed or resized to encompass the information entirely within the first
3 region 211. This can be accomplished by changing an aspect ratio of the broadcast in-
4 formation, or by leaving a portion of the first region 211 blank while not changing any
5 aspect ratio.

6
7 In a preferred embodiment, the menu bar in the second region 212 is similar
8 even when the first region 211 is used to display web information. Thus, the individual
9 recipients 110 can have a continuous display of a selected television signal even while
10 requesting and displaying web information.

11 12 Control Panel and Ticker

13
14 A second panel 2B shows a screen 220 having a first region 221 for display
15 of broadcast information, and a set of second regions 212 for display of web information
16 in an opaque, transparent, translucent, or at least partially transparent or translucent,
17 manner.

18
19 In a preferred embodiment, the second panel 2B comprises a model for the
20 default home page that is accessed by most individual recipients 110 upon startup of the
21 system 100 (described in further detail with reference to figure 3).

1 The first region 221 for display of broadcast information is modeled as a
2 web graphic that is transparent, either fully or partially, with a selected television signal
3 designated as a background source. The display controller 140 formats the screen 220 to
4 display the background source, except in the set of second regions 222 where the back-
5 ground graphic is overlaid by one or more translucent or opaque (or at least partially
6 translucent) selected web graphics. These selected web graphics can themselves include
7 television signals.

8
9 The set of second regions 222 includes a first subset, including control
10 buttons for selecting preferences or requesting a particular service (such as a selected
11 screen for composing or reviewing electronic mail). The choice of which control ele-
12 ments to display can be responsive to one or more of the following:

- 13
- 14 o preferences set by the individual recipients 110, or implied by their past actions;
 - 15
 - 16 o selections made by the individual recipients 110 using the control elements them-
 - 17 selves; and
 - 18
 - 19 o interactive information made available by the system 100, such as news bulletins
 - 20 or alerts indicating incoming messages.

1 The set of second regions 222 also includes a second subset, including an
2 animated ticker for continuously displaying information that can be of interest to the in-
3 dividual recipients 110. The choice of what information to display in the animated ticker
4 can be responsive to one or more of the following:

- 5
- 6 o preferences set by the individual recipients 110, or implied by their past actions,
7 operating to filter a sequence of new information; and
- 8
- 9 o selections made by the individual recipients 110, including selecting one or more
10 of the ticker elements for further information.
- 11

12 When the individual recipients 110 make selections responsive to the ticker ele-
13 ments, the system 100 responds similarly to any other request for interactive in-
14 formation. For example, each ticker element can include an HTML pointer to a
15 web page or embedded object for further display or processing.

16

17 Broadcast Information in a Web Frame

18

19 A third panel 2C shows a screen 230 having a first region 231 for display of
20 web information, including a second region 232 for display of broadcast information in a
21 frame of the web page.

1 In a preferred embodiment, the second region 232 for display of broadcast
2 information includes an entire screen of television signals, either resized but using a same
3 aspect ratio, or resized or not and using a different aspect ratio, to present the entire tele-
4 vision signal screen is present without distortion.

5
6 The first region 231 for display of web information can include a set of em-
7 bedded objects, including HTML links to other web objects, which can themselves com-
8 prise frames having other selected television signals.

9
10 Broadcast Information as a Web Embedded Object

11
12 A fourth panel 2D shows a screen 240 having a first region 241 for display
13 of web information, and a second region 242 for display of broadcast information as a
14 designated embedded object of the web page.

15
16 The first region 241 for display of web information can include any type of
17 objects that can otherwise be embedded in a web document, including text, graphical ob-
18 jects, animation, program elements, or frames or sub-frames.

19
20 The second region 242 for display of broadcast information comprises a
21 section of the web information that includes a graphic whose source is a dynamic and
22 continuous display of a television signal. The particular television signal can be resized

1 and have its aspect ratio altered as well. The particular television signal can be selected
2 in response to a choice by the web information provider, such as by so indicating in an
3 HTML tag, or can be selected in response to a choice by the individual recipients 110.
4 The graphic whose source is a dynamic and continuous display of a television signal can
5 itself be coupled to any web object, such as any personalized element or clickable object.

7 *Method of Operation*

8
9 Figure 3 shows a process flow diagram of a method for combining televi-
10 sion broadcast and personalized/interactive information.

11
12 A method 300 is performed by the system 100, including the display ele-
13 ment 120, the input element 130, the display controller 140, the broadcast information
14 interface 150, and the interactive information interface 160. The system 100 is also re-
15 sponsive to input from the individual recipients 110.

16
17 At a flow point 310, the system 100 is brought into an initial state, such as
18 by turning the power on or by using a reset switch.

19
20 At a step 311, the system 100 performs any required initialization, such as
21 the following:

1 o performing any required power-on self-test or self-authentication;

2
3 o retrieving any required global information, such as time or location of the system
4 100;

5
6 o authenticating the particular individual recipients 110, such as using a login proce-
7 dure, and retrieving any preferences for those particular individual recipients 110;
8 and

9
10 o selecting a web page, such as an initial page or home page, at which the particular
11 individual recipients 110 can begin receiving web content.

12
13 In a preferred embodiment, the system 100 records a location of the home page,
14 and any preferences for retrieving information from that home page, with a set of
15 recorded preferences 350 for the individual recipients 110. For example, the pref-
16 erences 350 can include a set of parameters for a home page that includes a CGI
17 script or JavaScript program.

18
19 At a step 312, the interactive information interface 160 retrieves the se-
20 lected web page for the individual recipients 110.

1 At a step 313, the interactive information interface 160 retrieves any other
2 web content associated with the home page.

3
4 At a step 314, the system 100 determines if there is any broadcast content
5 included among the web content to be retrieved. If so, the method 300 continues with the
6 step 315. If not, the method 300 continues with the step 317.

7
8 In a preferred embodiment, broadcast content can be included among the
9 web content to be retrieved using a URL including "TV://". This new "TV" protocol can
10 be used as either a location or as an image source, and can thus fully link any broadcast
11 television signal into any web page or frame.

12
13 For a first example, the "TV" protocol can be used as a top location typed
14 in at a menu bar, in HTML using "tv://3", or in Javascript (using top.location =
15 "tv://same").

16
17 For a second example, the location can specify a frame in a frameset, in
18 HTML (using <FRAME SRC="tv://3" NAME="tv">), or in Javascript (using
19 top.frame[0].location = "tv://3").

20
21 For a third example, the location can be specified as the destination of a
22 link, in HTML using the HREF property (using).

1
2 Thus, the author of a web page or frame can set the entire background of
3 the web page or frame to correspond to a broadcast television signal, or can provide a
4 selected "screen" region in which the broadcast television signal is to be displayed.

5
6 For a first example, the following HTML lines each set the background im-
7 age of the page to correspond to a broadcast television signal:

8
9 <BODY BGCOLOR="transparent" BACKGROUND="tv://same/"> (351)
10 <BODY BGCOLOR="transparent" BACKGROUND="tv://03"> (352)
11 <BODY BGCOLOR="transparent" BACKGROUND="tv://MTV"> (353)

12
13 HTML line 351 sets the background image source to whatever channel the
14 television tuner is then currently set to. HTML line 352 specifically sets the background
15 image source to channel three. HTML line 353 specifically sets the background image
16 source to the channel broadcasting MTV.

17
18 For a second example, the following HTML lines include a broadcast tele-
19 vision signal as a window in the web page content:

20
21 (354)
22 (355)

1 (356)

2 (357)

3
4 HTML line 354 sets the image source to whatever channel the television
5 tuner is then currently set to. HTML line 355 specifically sets the image source to chan-
6 nel seven, with a specified height and width. HTML line 356 specifically sets the image
7 source to channel 36. HTML line 357 specifically sets the image source to the channel
8 broadcasting KPIX.

9
10 For a third example, the following HTML lines include a broadcast televi-
11 sion signal as a full-screen television window in the web page content:

12
13 (358)

14
15 HTML line 358 sets the anchor reference for a window to a broadcast tele-
16 vision signal.

17
18 At a step 315, the broadcast information interface 150 retrieves the selected
19 broadcast content. For example, if the selected broadcast content includes a selected
20 television signal for video display and audio presentation, the broadcast information in-
21 terface 150 tunes to the associated television channel for that television signal and re-
22 trieves that television signal.

1
2 At a step 316, the system 100 determines if any personalized information is
3 included with the broadcast content. For example, the broadcast television signal can in-
4 clude personalized information or other information, such as web browser "cookies," in
5 the VBI or other out-of-band portion of the television signal. The display controller 140
6 can alter the presentation of the broadcast content, such as for example by selecting a
7 particular camera angle (or otherwise selecting among multiple broadcast channels,
8 sources, or streams), in response to the personalized information. Moreover, the person-
9 alized information can direct the system 100 to retrieve different web content; if so, the
10 method 300 returns to the step 312.

11
12 In alternative embodiments, the broadcast television signal can include
13 much other information, such as pointers to web content (URLs or embedded web ob-
14 jects), in the VBI or other out-of-band portion of the television signal. The system 100
15 can use this other information to display options to the individual recipients 110, to alter
16 the preferences 350 for the individual recipients 110, or to otherwise alter its state to en-
17 hance the simultaneous presentation of the broadcast content and the (individual or per-
18 sonalized) web content.

19
20 At a step 317, the display controller 140 formats the screen for display on
21 the television monitor 121. As part of this step, the display controller 140 integrates the
22 selected broadcast content into the web content for display (and presentation) using the

1 display element 130. In a preferred embodiment, the display controller 140 uses infor-
2 mation from the preferences 350 to determine, at least in part, how to integrate the se-
3 lected television signal into the web content.

4
5 At a step 318, the display element 120 displays the screen to the individual
6 recipients 110. After a short period of time, the method 300 returns to the step 317 to re-
7 format and redisplay the screen. For example, if the web content can include animation
8 or a program element, or the broadcast content can include a motion picture (as it typi-
9 cally will).

10
11 At a step 319, the input element 130 detects input from one or more of the
12 individual recipients 110. A wide variety of possible inputs, and consequently a wide va-
13 riety of possible responses, are within the scope and spirit of the invention. These in-
14 clude at least the following:

- 15
16 o The input includes personalization information or otherwise alters preferences for
17 the individual recipients 110. The method 300 returns to the step 312 so that the
18 display controller 140 can retrieve other web content, and consequently reformat
19 and redisplay the screen, in response to the personalization information. The sys-
20 tem 100 can also record the personalization information in the preferences 350.

1 o The input selects new selected interactive information. The method 300 returns to
2 the step 312 so that the interactive information interface 160 can retrieve the new
3 selected interactive information, similar to retrieving the home page.

4
5 o The input turns the system 100 off. The system 100 performs any required termi-
6 nation, and returns to a quiescent state. When the system is next activated, it will
7 return to the flow point 310.

8 9 *General Applicability of the Invention*

10
11 Those skilled in the art will recognize, after perusal of this application, that
12 the particular examples shown herein are a few of the many possibilities for combining
13 web content (which can be interactive and personalized) with broadcast content (which
14 can be dynamic and selected from multiple sources).

15
16 Any individual web object can have a selected television signal presented
17 for display as an embedded object within the web object, such as a frame or sub-frame, a
18 graphical object, or an object presented using a program element (such as a CGI script or
19 Java or JavaScript program). For example, a web object can be constructed including all
20 or part of many selected television signals for display, so the individual recipients 110
21 can choose to watch individual television signals according to parameters selected and
22 performed by a web server or application.

1
2 Any selected television signal can be presented for display underlying a
3 transparent web object, so that the web object can be presented in conjunction with the
4 television signal without obscuring any significant part of the television signal. Moreo-
5 ver, principles of web design can be used in conjunction with the television signal, so
6 elements of the television signal can be made interactive. For example, a television sig-
7 nal advertisement including a telephone number can have a web object superposed so in-
8 dividual recipients 110 can select the telephone number to call it.

9
10 *Alternative Embodiments*

11
12 Although preferred embodiments are disclosed herein, many variations are
13 possible which remain within the concept, scope, and spirit of the invention, and these
14 variations would become clear to those skilled in the art after perusal of this application.